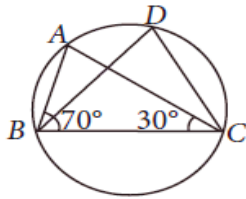


## CIRCLES

### Assertion Reason and Case Study

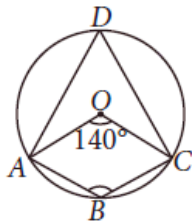
- (a) Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.
- (b) Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.
- (c) Assertion is correct statement but Reason is wrong statement.
- (d) Assertion is wrong statement but Reason is correct statement.

Q.1. Assertion : In the given figure,  $\angle ABC = 70^\circ$  and  $\angle ACB = 30^\circ$ . Then,  $\angle BDC = 80^\circ$ .



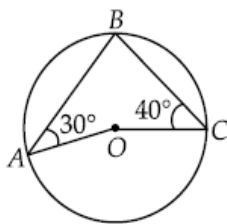
Reason : Angles in the same segment of a circle are equal.

Q.2. Assertion : In the given figure, O is the centre of circle. If  $\angle AOC = 140^\circ$ , then  $\angle ABC = 110^\circ$ .



Reason : In cyclic quadrilateral, opposite angles are supplementary.

Q.3. Assertion : In the given figure,  $\angle BAO = 30^\circ$  and  $\angle BCO = 40^\circ$ . Then the measure of  $\angle AOC = 60^\circ$ .

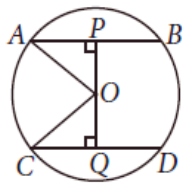


Reason : Angle subtended by an arc of a circle at the centre of the circle is twice the angle subtended by that arc on the remaining part of the circle.

Q.4. Assertion : AB and CD are two parallel chords of a circle whose diameter is AC. Then  $AB \neq CD$ .

Reason : Perpendicular from the centre of a circle bisects the chord.

Q.5. Assertion : In the given figure, O is the centre of the circle of radius 5 cm. If  $OP \perp AB$ ,  $OQ \perp CD$ ,  $AB \parallel CD$ ,  $AB = 6$  cm and  $CD = 8$  cm, then  $PQ = 6$  cm.

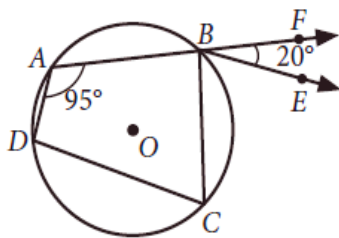


Reason : Perpendicular bisectors of two chords of a circle intersect at its centre.

Q.6. Assertion : The length of a chord which is at a distance of 5 cm from the centre of a circle of radius 10 cm is 17.32 cm.

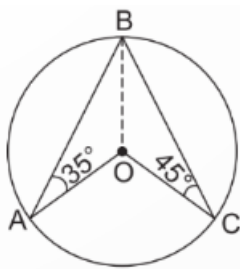
Reason : The perpendicular from the centre of a circle to a chord bisects the chord.

Q.7. Assertion : In the given figure, ABCD is a cyclic quadrilateral in which AB is extended to F and  $BE \parallel DC$ . If  $\angle FBE = 20^\circ$  and  $\angle DAB = 95^\circ$ , then  $\angle ADC = 105^\circ$ .



Reason : A line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.

Q.8. Assertion (A): If O is the centre of a circle and A, B and C are three points on a circle such that  $\angle OAB = 35^\circ$  and  $\angle OCB = 45^\circ$ , then  $\angle AOC = 160^\circ$ .

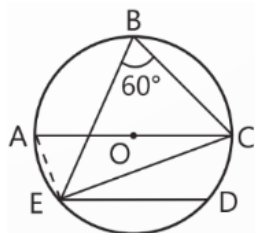


Reason (R): Angle subtended by an arc of a circle at the centre of the circle is double the angle subtended by an arc on the circumference.

Q.9. Assertion (A): Two diameters of a circle intersect each other at right angles. Then the quadrilateral formed by joining their end-points is a square.

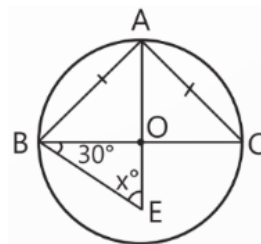
Reason (R): Equal chords subtend equal angles at the centre.

Q.10. Assertion (A): Chord ED is parallel to the diameter AC of the circle. If  $\angle CBE = 60^\circ$ , then  $\angle ACE$  is  $30^\circ$ .



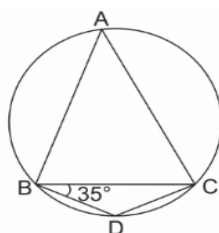
Reason (R): Same segment of a circle do not make equal angles at the circumference.

Q.11. Assertion (A): In the figure, E is any point in the interior of the circle with centre O. Chord AB is equal to chord AC. If  $\angle OBE = 30^\circ$ , the value of x is  $60^\circ$ .



Reason (R): Equal chords subtend equal angles at the centre.

Q.12. Assertion (A): In the adjoining figure,  $BD = DC$  and  $\angle DBC = 35^\circ$ , then the measure of  $\angle BAC$  is  $70^\circ$ .



Reason (R): The sum of opposite angles of a cyclic quadrilateral is  $180^\circ$ .

Q.13. Assertion(A): Angles in the same segment of a circle are equal.

Reason: In cyclic quadrilateral, opposite angles are supplementary.

Q.14. Assertion(A): Perpendicular bisectors of two chords of a circle intersect at its centre.

Reason(R): A line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.

Q.15. Assertion (A): If an arc PQ of a circle subtends angle POQ at the centre O and angle PAQ at a point A on the remaining part of the circle, then  $\angle POQ = 2 \angle PAQ$ .

Reason (R): An exterior angle of a triangle is equal to the sum of the two interior opposite angles.

Q.16. Assertion (A): The perpendicular from the centre of a circle to a chord bisects the chord.

Reason (R): The length of the perpendicular from a point to a line is defined as the distance of the line from the point.

Q.17. Assertion (A): If two chords of a circle are equidistant from the centre, then the chords must be equal in length.

Reason (R): Chords equidistant from the centre (or corresponding centres) of a circle (or of congruent circles) are equal.

Q.18. Assertion: There can be infinite numbers of equal chords of a circle.

Reason: A circle has only finite number of equal chords.

Q.19. Assertion: Equal arcs on a circle cannot be said as a major arc or a minor arc.

Reason: If a circle is divided into three equal arcs, each is a major arc.

Q.20. Assertion: A chord of a circle, which is twice as long as its radius, is a diameter of the circle.

Reason: As we know that any chord whose length is twice as long as the radius of the circle always passes through the centre of the circle

### CASE STUDY

Q.1.

A circular park of radius 20 m is situated in a colony. Three boys Ankur, Syed and David are standing at equal distance on its boundary each having a toy telephone in his hands to talk each other.



In mathematics; A, S and D are the position of Ankur, Syed and David are sitting at equal distance and O be the position of the centroid of a triangle.



**Q 1. The length of AP is:**

- |         |         |
|---------|---------|
| a. 20 m | b. 30 m |
| c. 15 m | d. 25 m |

**Q 2. The distance between any two boys is:**

- |                   |                   |
|-------------------|-------------------|
| a. $20\sqrt{3}$ m | b. $10\sqrt{3}$ m |
| c. $15\sqrt{3}$ m | d. 20 m           |

**Q 3. The angle between AS and SD is:**

- |               |               |               |               |
|---------------|---------------|---------------|---------------|
| a. $65^\circ$ | b. $60^\circ$ | c. $70^\circ$ | d. $75^\circ$ |
|---------------|---------------|---------------|---------------|

**Q 4.  $\angle SOD$  is equal to:**

- |               |               |                |               |
|---------------|---------------|----------------|---------------|
| a. $70^\circ$ | b. $60^\circ$ | c. $120^\circ$ | d. $80^\circ$ |
|---------------|---------------|----------------|---------------|

**Q 5.  $\angle OSP$  is equal to:**

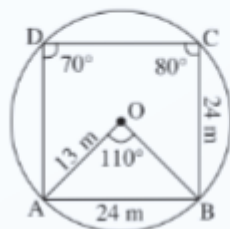
- |               |               |               |               |
|---------------|---------------|---------------|---------------|
| a. $50^\circ$ | b. $60^\circ$ | c. $30^\circ$ | d. $70^\circ$ |
|---------------|---------------|---------------|---------------|

Q.2.

I have a circular garden in the outside of the city. Municipality decided to put some benches, so that the people can sit there and can have some fresh air.



In the given figure, there are two benches of same colour A and B, which are placed at a distance  $AB = 24$  m. Similarly, two other benches of same colour C and D are also placed at a same distance of 24 m from each other.



Q 1. The measure of  $\angle BOC$  is:

- a.  $120^\circ$     b.  $55^\circ$     c.  $110^\circ$     d.  $60^\circ$

Q 2. The measure of  $\angle ABC$  is:

- a.  $130^\circ$     b.  $120^\circ$     c.  $105^\circ$     d.  $110^\circ$

Q 3. The perpendicular distance from centre O to the chord AB is:

- a. 6 m    b. 5 m    c. 10 m    d. 12 m

Q 4. The value of angle  $\angle BAO$  is:

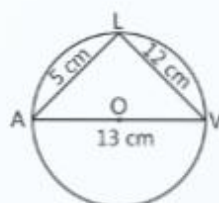
- a.  $60^\circ$     b.  $35^\circ$     c.  $70^\circ$     d.  $80^\circ$

Q 5. The measure of  $\angle DAO$  is:

- a.  $70^\circ$     b.  $65^\circ$     c.  $80^\circ$     d.  $85^\circ$

Q.3.

Three boys Anshul, Vivek and Lalit are playing a game by standing on the boundary of a circle of diameter 13 cm with centre O. Anshul throws a ball to Vivek, Vivek to Lalit and Lalit to Anshul and so on. The distance between Anshul and Lalit is 5 cm and between Vivek and Lalit is 12 cm.



**Q 1. Measure  $\angle ALV$ :**

- a.  $60^\circ$       b.  $90^\circ$       c.  $50^\circ$       d.  $40^\circ$

**Q 2. The length of the longest chord is:**

- a. 12 cm      b. 5 cm      c. 13 cm      d. 16 cm

**Q 3. If  $\angle LAV = 50^\circ$ , then  $\angle AVL$  is:**

- a.  $140^\circ$       b.  $50^\circ$       c.  $40^\circ$       d.  $100^\circ$

**Q 4. The area covered by these three persons is:**

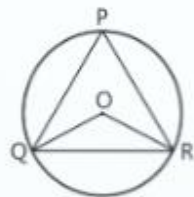
- a.  $20 \text{ cm}^2$       b.  $30 \text{ cm}^2$       c.  $25 \text{ cm}^2$       d.  $35 \text{ cm}^2$

**Q 5. Equal chords of a circle subtends equal angle at:**

- a. centre  
b. end point of diameter  
c. other than centre  
d. None of the above

Q.4.

Government of India is working regularly for the growth of handicapped persons. For these three STD booths situated at point P, Q and R are as shown in the figure, which are operated by handicapped persons. These three booths are equidistant from each other as shown in the figure.



On the basis of the above information, solve the following questions:

**Q1.** Which type of  $\triangle PQR$  is in the given figure?

**Q2.** Measure  $\angle QOR$ .

**Q3.** Find the value of  $\angle OQR$ .

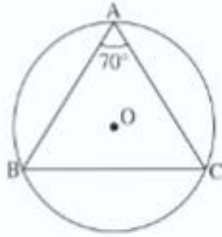
**Q4.** Is it true that points P, Q, and R lie on the circle?

Q.5.

Narendra Modi Stadium also known as Motera Stadium is situated in Ahmedabad, Gujarat. Currently it is the largest stadium in the world with a capacity of 1,32,000 viewers. In the field there are 2 ends known as bowler end and striker end.



Geometrically, O is the centre of a circle,  $\angle BAC = 70^\circ$ , which is shown in figure.



On the basis of the above information, solve the following questions:

**Q1. Find the angle subtended by the chord BC at the centre.**

**Q2. Find  $\angle OBC + \angle OCB$ .**

**Q3. If  $OB = 5$  cm and  $BC = 6$  cm, then find the distance from centre O to the chord BC.**

**Q4. If point D lies on the circle between B and C, then find  $\angle BDC$ .**